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Eco-driving – Introduction of the Japanese activities and a plan of demonstration experiment in China –

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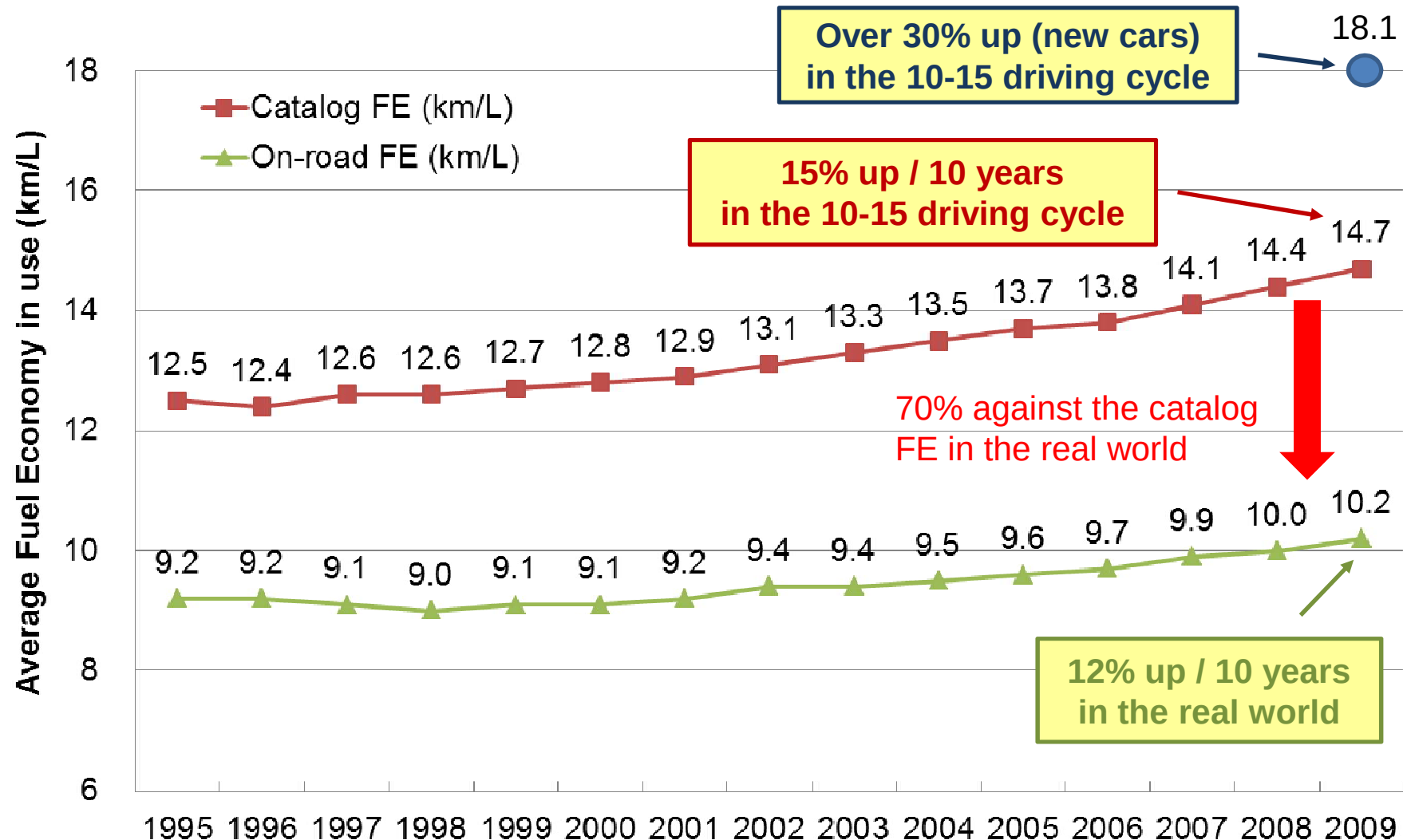


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- ◆ **Introduction of Eco-driving in Japan**
 - ✓ Positioning in Measures (energy, CO₂), Effects, Promotion Activities, Driving Skills and a Case Study
- ◆ **Eco-driving Management System (EMS) with a Digital Tachograph**
- ◆ **Plan of an Eco-driving Experiment in China (Wuhan)**
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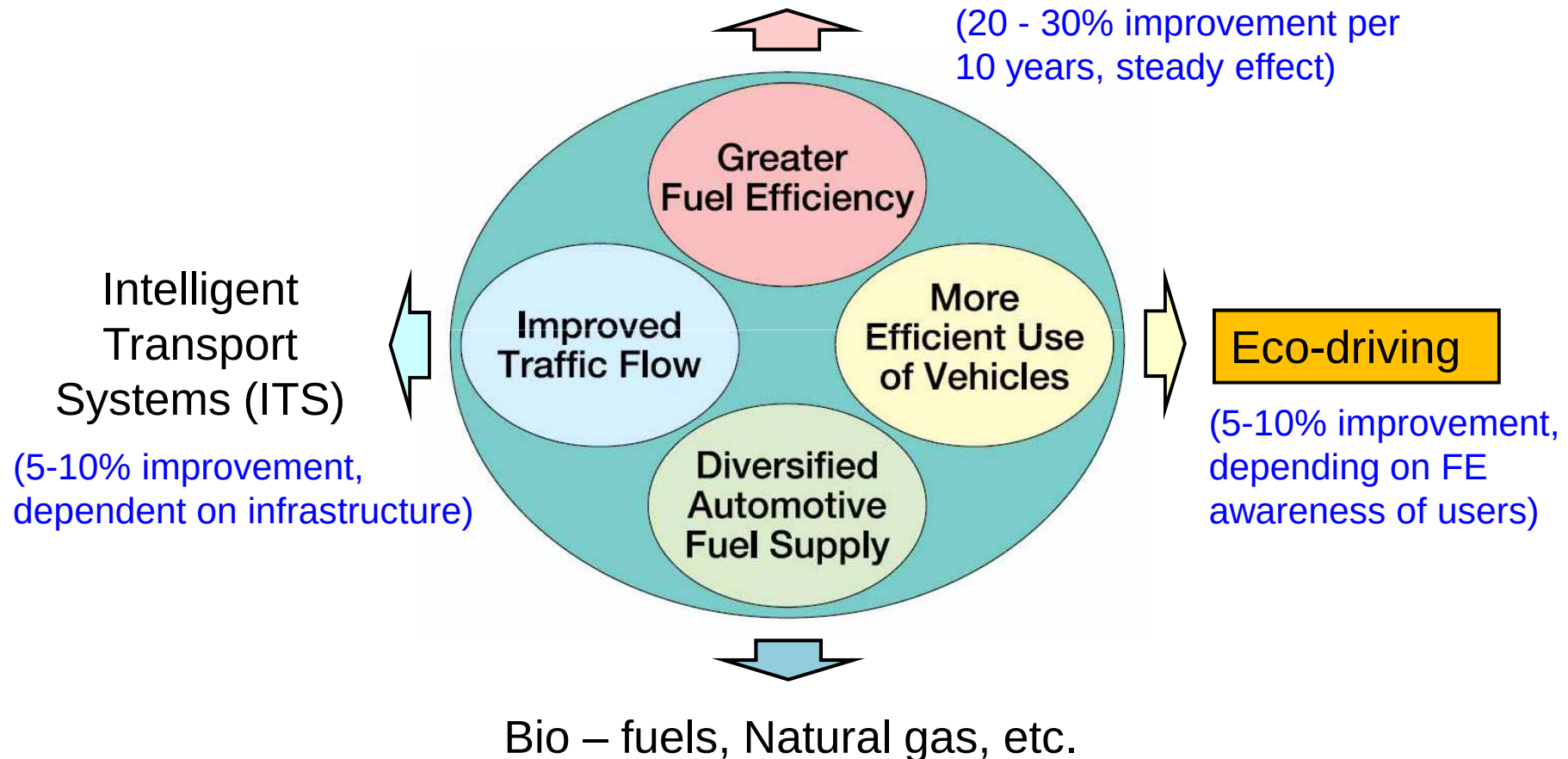
Average Fuel Economy of Gasoline Cars



*) Source: On the Road to Sustainable Mobility, 2011, JAMA

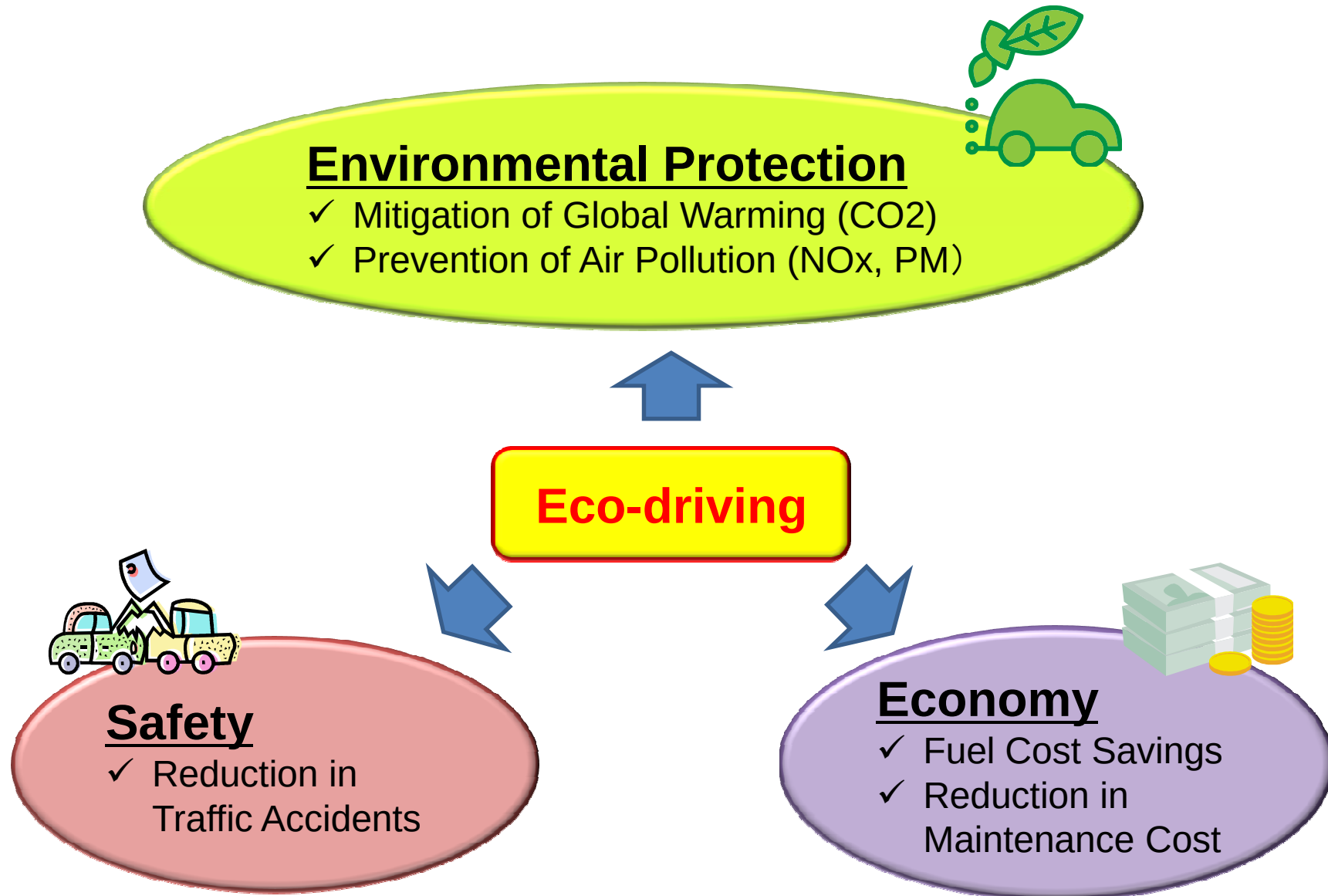
4 Categories of CO2 Emission Reduction

FE Standards, Reducing Vehicle Weight,
Next-generation Vehicles & Promoting Replacement



*) Source: Reducing CO2 Emissions in the Global Road Transport Sector, 2008, JAMA (<http://www.jama-english.jp/>)

3 Categories of Eco-driving Effects



Activities of Eco-driving Promotion



2003 Liaison group for Eco-driving promotion

Definition of the 10 tips of Eco-driving

2005 Kyoto Protocol Target Achievement Plan

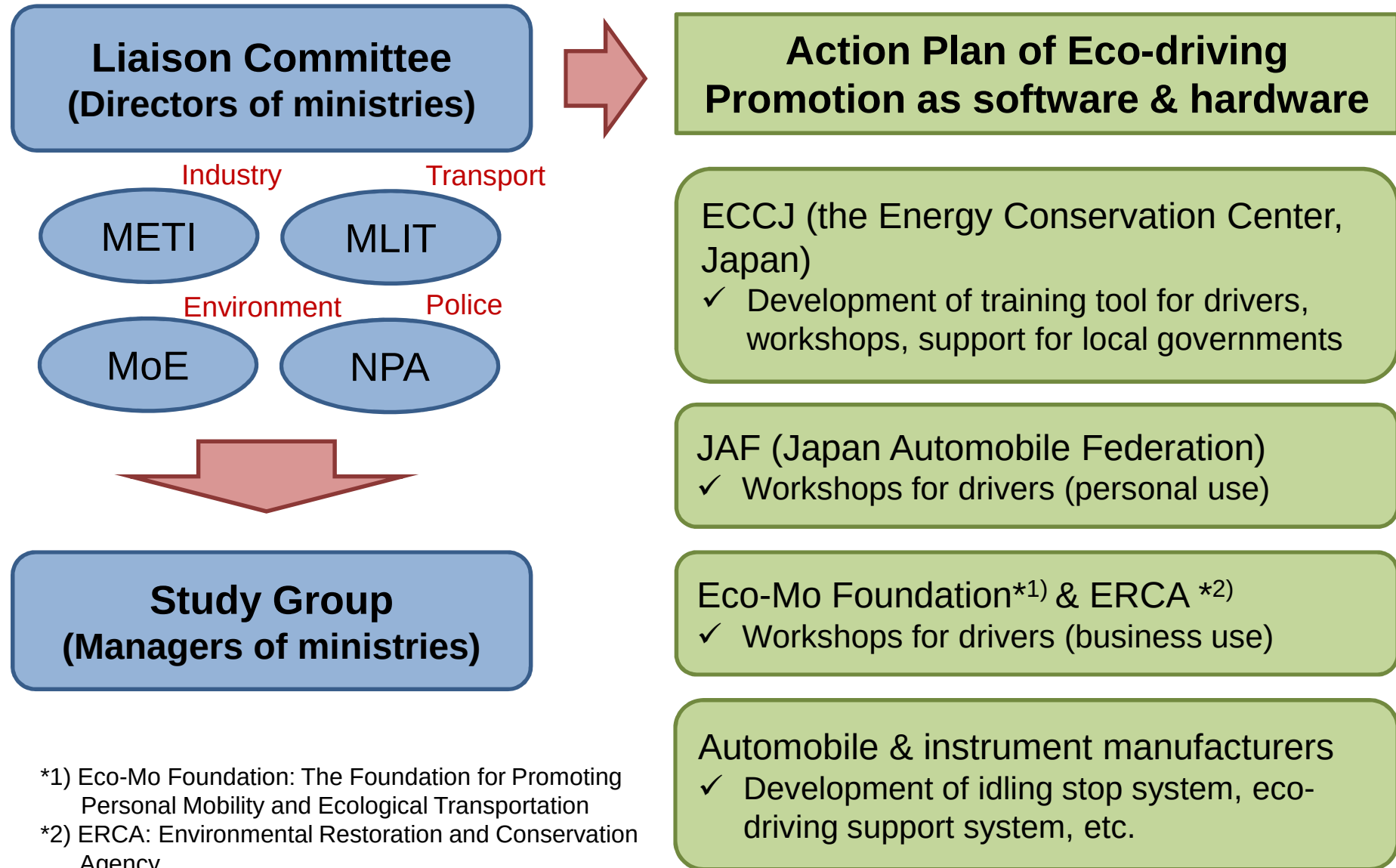
2006 Action Plan for Eco-driving Promotion

Review of the definition, awareness-raising activities, promotion of supporting devices, establishment of evaluation system, initiatives across local governments with related organizations, etc.

2008 Revised Kyoto Protocol Target Achievement Plan

Eco-driving is recognized as one measure to promote eco-friendly vehicle use.

Japanese Eco-driving Promotion System



Eco-driving 10 Tips for Passenger Cars

1. Accelerate gently. (e-start, 20 km/h in 5s)

2. Maintain a steady speed.

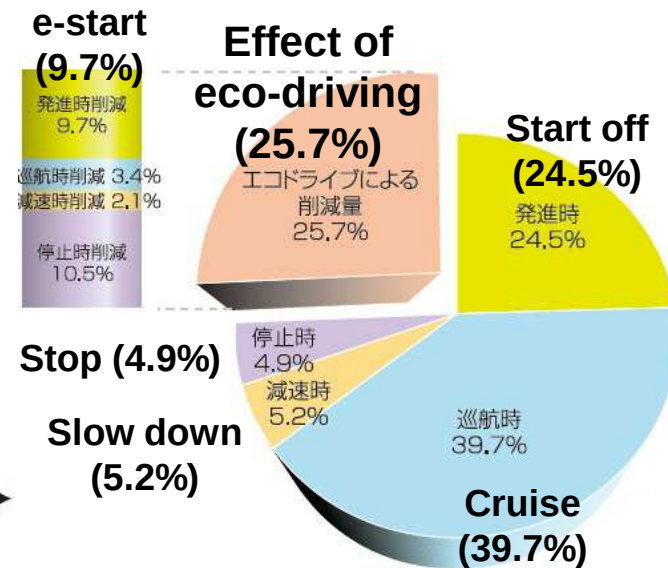
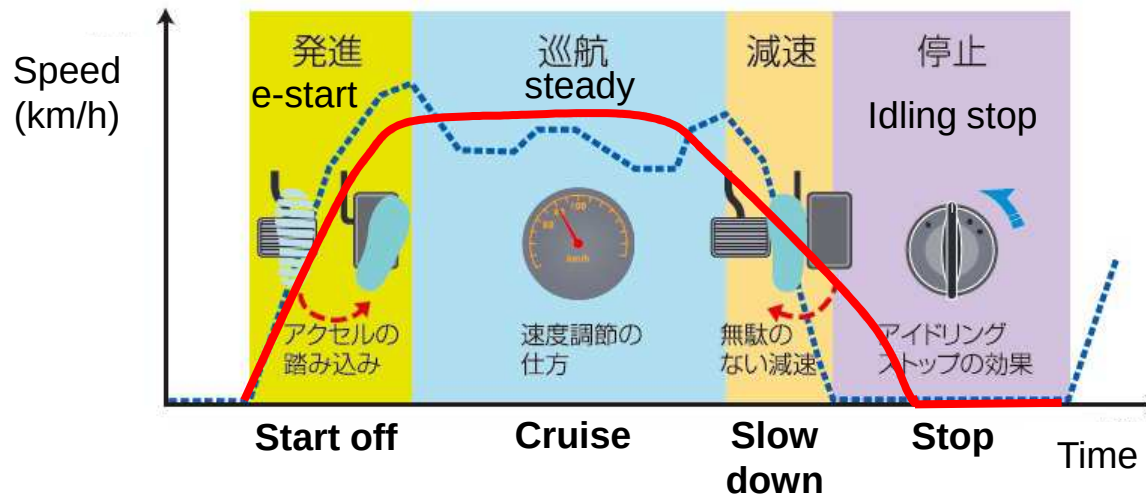
3. Slow down by releasing the accelerator.

4. Limit the use of your air conditioner.

5. Don't idle your engine.

6. Don't warm up your engine before starting off.
7. Know your itinerary.
8. Check your tire pressure regularly.
9. Reduce your load.
10. Respect parking regulations.

4 main skills of eco-driving

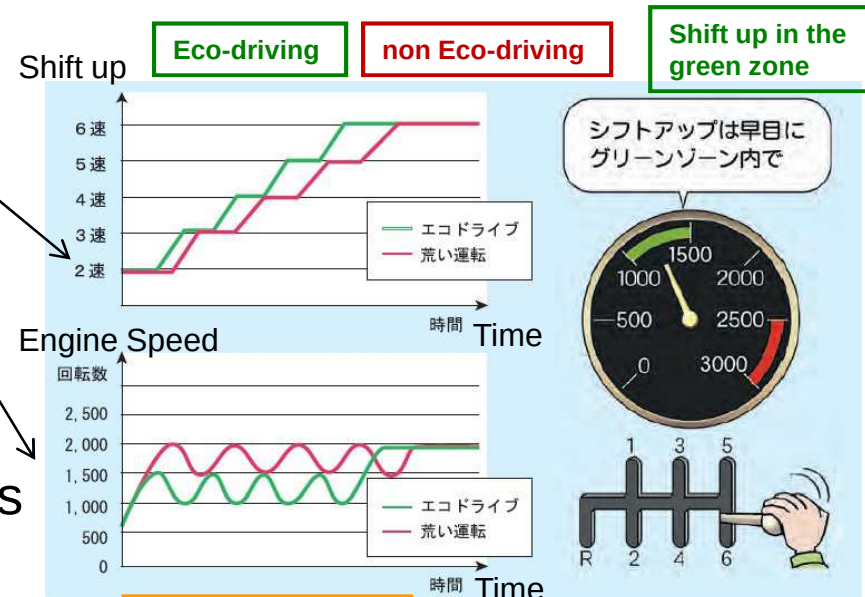


*) Source: Eco-driving Textbook of Passenger Cars (<http://www.ecomo.or.jp/environment/ecodrive/>)

Eco-driving 5 Tips for Trucks and Buses

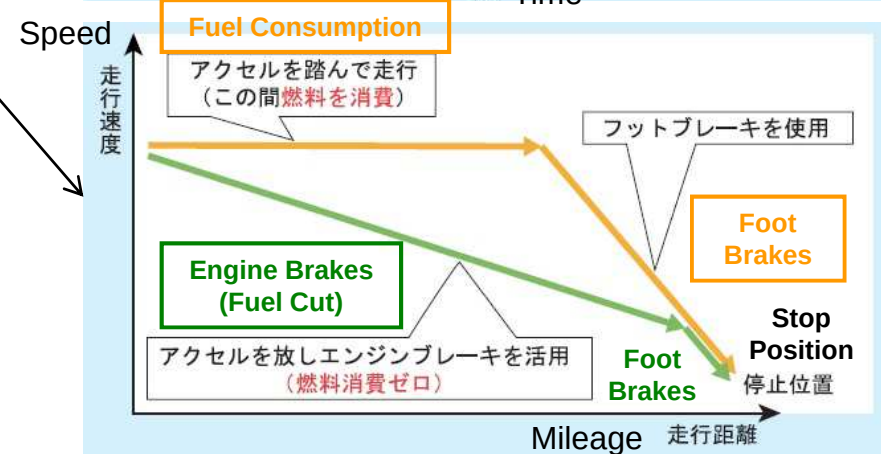
Driving Skill

1. Gentle starting off & acceleration
2. Early shift up (1000 – 1500 rpm)
3. Steady & economic speed
40 – 60 km/h (public road), 80 km/h (highway)
4. Prediction & use of the engine brakes
5. Suppression of idling



Maintenance

- ✓ Check the air filter.
- ✓ Check the engine oil.
- ✓ Check the tire pressure.

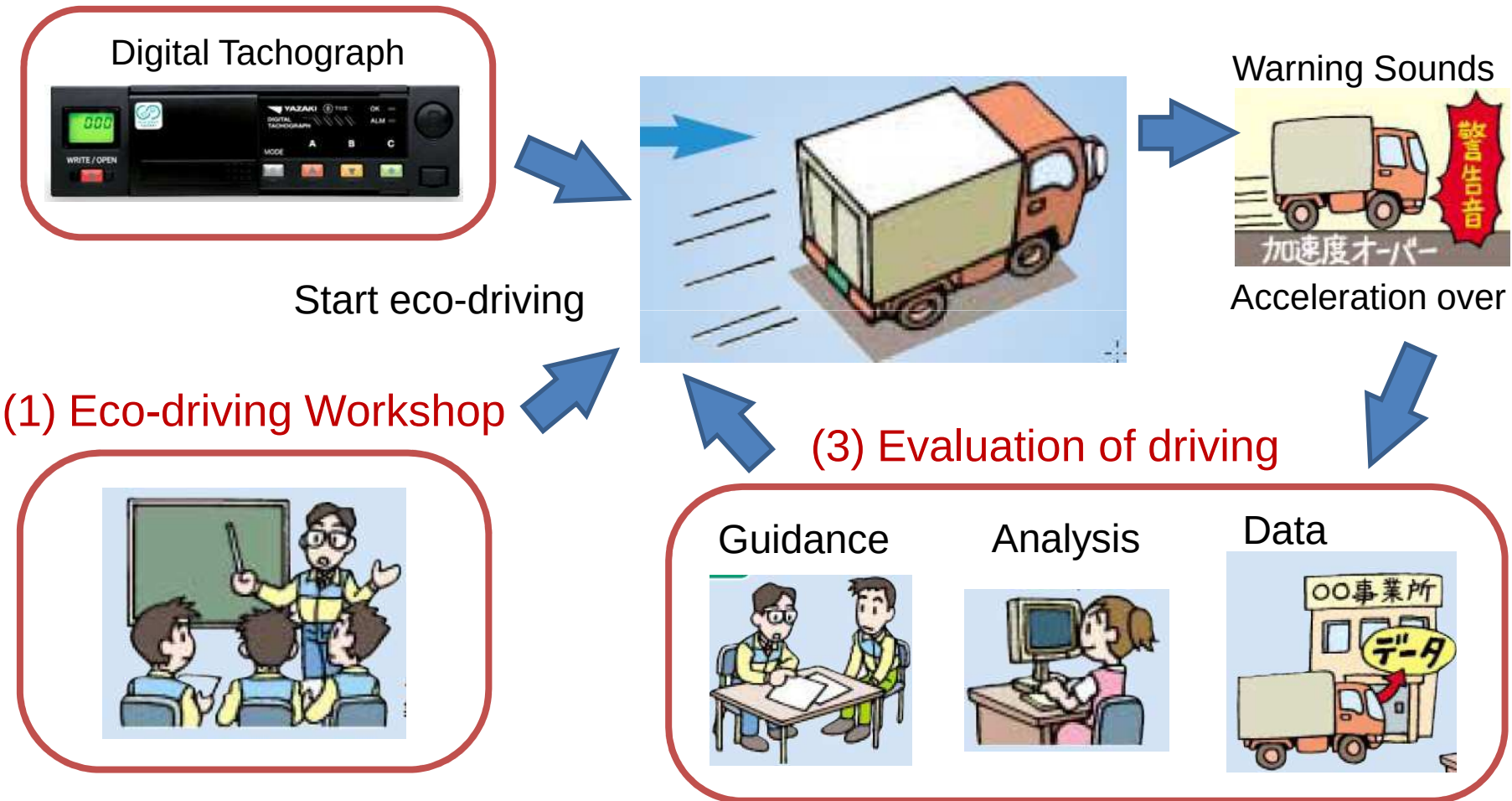


*) Source: Eco-driving Textbook of Truck & Bus (<http://www.ecomo.or.jp/environment/ecodrive/>)

EMS (Eco-Driving Management System)

- Planned and continued action with objective evaluation and guidance

(2) Eco-driving Support System



*) Source: MLIT website (<http://www.mlit.go.jp/jidosha/>)

Eco-driving Support System (YAZAKI ES)

[Basic System]



Digital Tachograph DTG4



Card Reader / Writer
(USB 2.0)



Analysis System
(SD6)



Compact Flash
Card (128 MB)

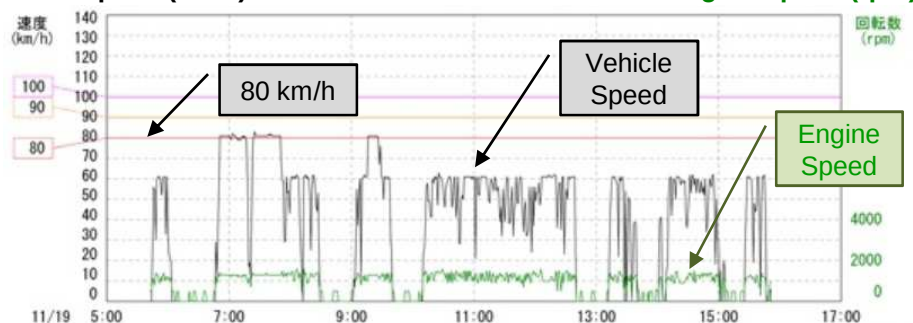
Engine Speed Over



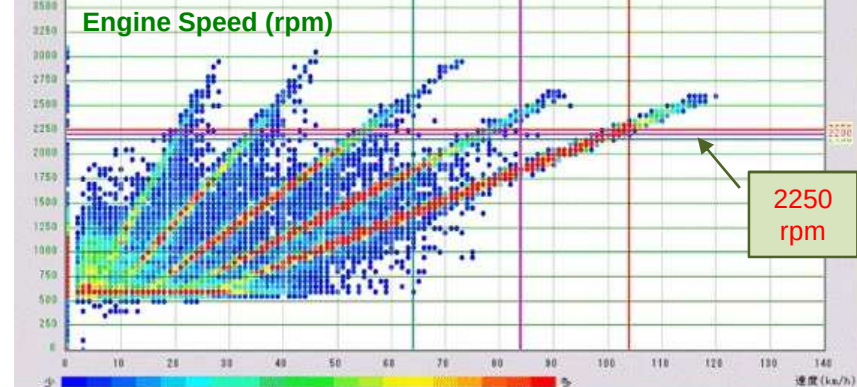
[Sensors]

- Basic: Vehicle & Engine Speeds
- Optional: G Sensor, Accelerator pedal position, Sloping road, Temperature, Alcohol checker

Vehicle Speed (km/h)



Engine Speed (rpm)



Vehicle Speed (km/h)

*) Source: <http://www.yazaki-group.com/instrumentation/>

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Cost Benefits of Eco-driving (Diesel Trucks)



Method	Fuel Economy Improvement Rate	Effect of Reducing Fuel (L/year)	Effect of Reducing Fuel Cost (M yen/year)	EMS Cost (M yen)	Cost Payback of EMS (year)
Eco-driving workshop	4.7%	8,978	1.08	1.20	1.1
Workshop + Digital Tachograph	15.0%	26,087	3.13	7.32	2.3

*) Source: Kanagawa Prefecture (<http://www.pref.kanagawa.jp/cnt/f642/>)

Typical Carrier:

30 MD trucks, average FE 5 km/L, annual mileage 33,333 km/year, fuel price 120 yen/L

Costs:

Consultant Costs = 1.2 million yen,

Digital Tachograph (30 units) = 6.12 million yen excluding maintenance costs

Demonstration Experiment in Thailand



Diesel Trucks (5 x 5 units)



Measurement



Management

Shipping Company	FE before EMS (L/100km)	FE after EMS (L/100km)	Improvement Rate
A	20.9	17.8	15.1%
B	22.6	18.8	16.9%
C	36.1	31.7	12.1%
D	22.2	18.6	13.6%
E	21.0	18.1	14.7%

15%

*) Source: YAZAKI report, March 2011, (www.meti.go.jp/meti_lib/report/2011fy/E001705.pdf)

*) Fuel consumption is approximately proportional to the cumulative engine speed.

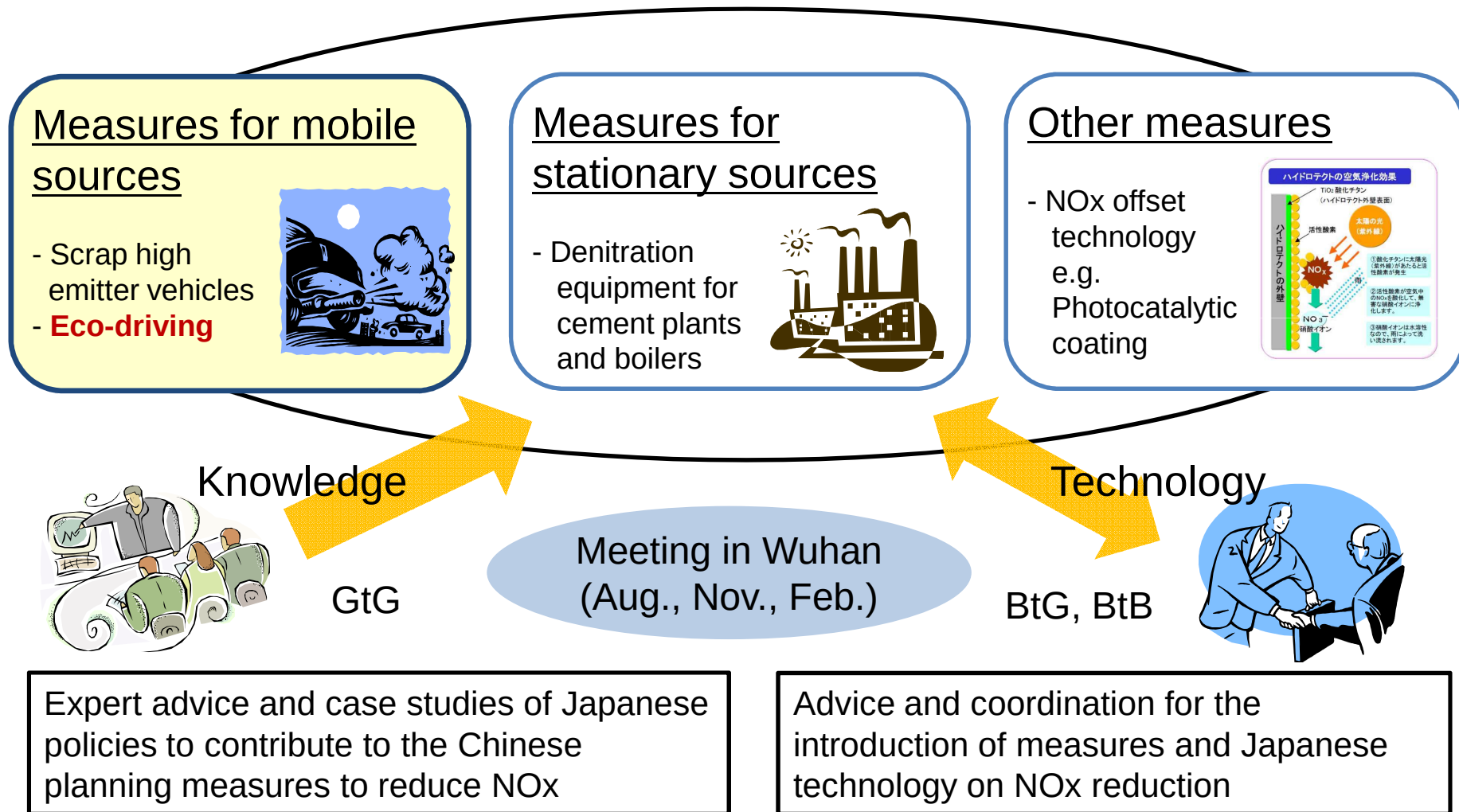
Demonstration Experiment in Thailand



5 minutes video provided by YAZAKI Energy System

NOx Reduction Project in Wuhan (by MoE)

Technical assistance towards the 12th five-year plan (2011-15) of China



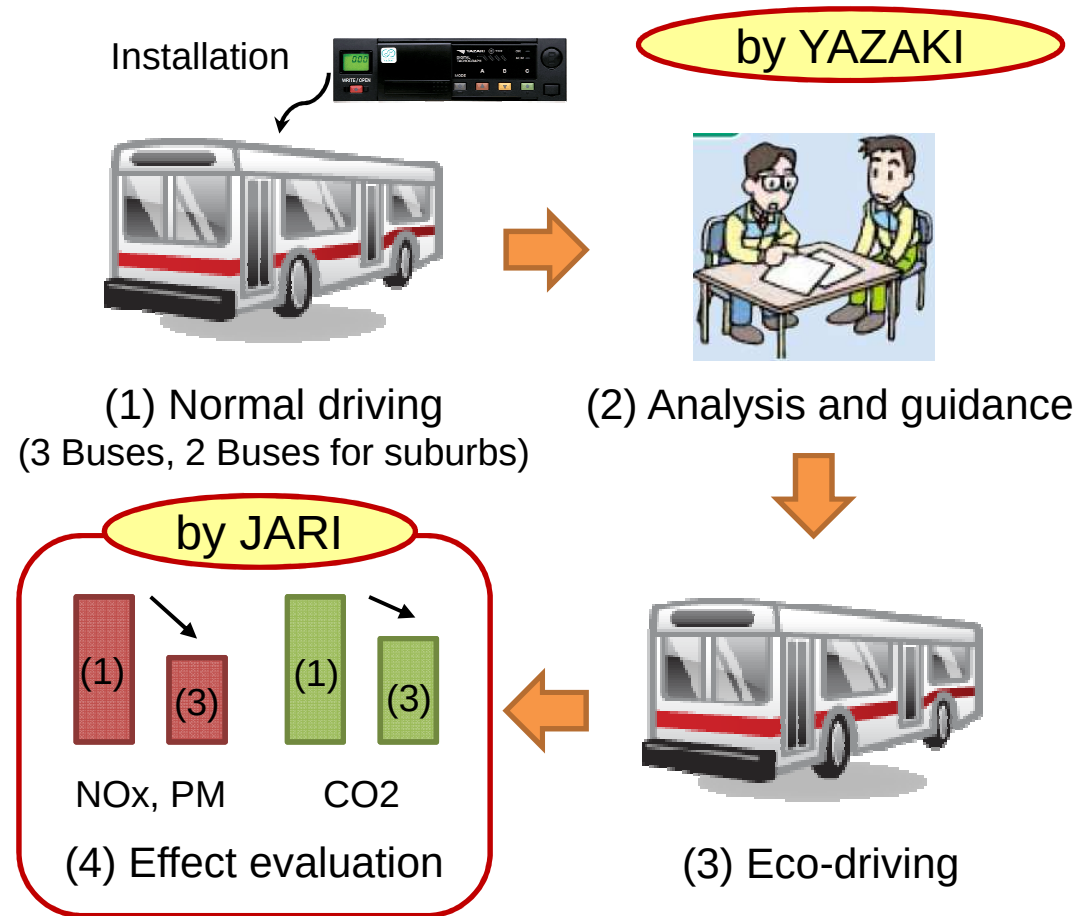
Plan of Eco-driving Demonstration in Wuhan



Meeting with a public bus company on 15 August, 2012



A test bus (Euro3 regulation)



Conclusion and Outlook



Thank you for your attention.

**If you have any comments and questions,
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